Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL QUALITY MEASURES CLEARINGHOUSE

General

Title

Diagnostic imaging: percentage of imaging studies for patients aged 18 years and older with knee pain who undergo knee MRI or MRA who are known to have had knee radiographs performed within the preceding three months based on information from the radiology information system (RIS), patient-provided radiological history, or other health-care source.

Source(s)

American College of Radiology (ACR), American Medical Association-convened Physician Consortium for Performance ImprovementÂ® (PCPIÂ®), National Committee for Quality Assurance (NCQA). Diagnostic imaging performance measurement set. Reston (VA): American College of Radiology (ACR); 2015 Feb. 58 p. [89 references]

Measure Domain

Primary Measure Domain

Clinical Quality Measures: Process

Secondary Measure Domain

Does not apply to this measure

Brief Abstract

Description

This measure is used to assess the percentage of imaging studies for patients aged 18 years and older with knee pain who undergo knee magnetic resonance imaging (MRI) or magnetic resonance arthrography (MRA) who are known to have had knee radiographs performed within the preceding three months based on information from the radiology information system (RIS), patient-provided radiological history, or other health-care source.

Rationale

Knee pain is common, affecting approximately 13.3% of the U.S. population (Cunningham & Kelsey, 1984). Radiographs are indicated as part of the initial work-up for knee pain. Advanced imaging studies should only be utilized when the diagnosis remains unclear. In recent years, there has been growing concern regarding the overuse of imaging services (Bennett et al., 2012). One report estimates that 20% to 50% of diagnostic imaging studies fail to provide information that improves the diagnosis or treatment of the patient (America's Health Insurance Plans [AHIP],

2008).

The following evidence statements are quoted verbatim from the referenced clinical guidelines and other references:

- The initial imaging examination for nontraumatic knee pain is radiography.
- A magnetic resonance imaging (MRI) examination for nontraumatic knee pain is indicated when the pain is persistent and conventional radiographs are nondiagnostic or when additional information is necessary before instituting treatment.
- An MRI is not indicated before a physical examination or routine conventional radiographs, or when there is diagnostic radiographic evidence of severe degenerative joint diseases, inflammatory arthritis, stress fracture, osteonecrosis, or reflex sympathetic dystrophy, for which additional imaging is not going to alter the treatment plan (Bennett et al., 2012).

Evidence for Rationale

American College of Radiology (ACR), American Medical Association-convened Physician Consortium for Performance ImprovementÂ® (PCPIÂ®), National Committee for Quality Assurance (NCQA). Diagnostic imaging performance measurement set. Reston (VA): American College of Radiology (ACR); 2015 Feb. 58 p. [89 references]

American College of Radiology (ACR). Five things physicians and patients should question. Philadelphia (PA): ABIM Foundation; 2012 Apr 4. 2 p.

America's Health Insurance Plans (AHIP). Ensuring quality through appropriate use of diagnostic imaging. Washington (DC): America's Health Insurance Plans (AHIP); 2008 Jul. 12 p.

Bennett DL, Nelson JW, Weissman BN, Kransdorf MJ, Appel M, Bencardino JT, Fries IB, Hayes CW, Hochman MG, Jacobson JA, Luchs JS, Math KR, Murphey MD, Newman JS, Rubin DA, Scharf SC, Small KM, Expert Panel on Musculoskeletal Imaging. ACR Appropriateness CriteriaÂ® nontraumatic knee pain. Reston (VA): American College of Radiology (ACR); 2012. 10 p. [46 references]

Cunningham LS, Kelsey JL. Epidemiology of musculoskeletal impairments and associated disability. Am J Public Health. 1984 Jun;74(6):574-9. PubMed

Primary Health Components

Imaging studies; knee pain; magnetic resonance imaging (MRI); magnetic resonance arthrography (MRA); knee radiographs; radiology information system (RIS)

Denominator Description

All imaging studies for patients aged 18 years and older with knee pain who undergo knee magnetic resonance imaging (MRI) or magnetic resonance arthrography (MRA)

Numerator Description

Imaging studies for patients known to have had knee radiographs performed within the preceding 3 months based on information from the radiology information system (RIS), patient-provided radiological history, or other health-care source (see the related "Numerator Inclusions/Exclusions" field)

Evidence Supporting the Measure

Type of Evidence Supporting the Criterion of Quality for the Measure

Type of Evidence Supporting the Selection of Quality for the Measure

A clinical practice guideline or other peer-reviewed synthesis of the clinical research evidence

A formal consensus procedure, involving experts in relevant clinical, methodological, public health and organizational sciences

One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

Additional Information Supporting Need for the Measure

Importance of Topic
As imaging technology continues to advance, the United States healthcare system has seen an increase in both the type and frequency of imaging studies being performed. The increase in utilization of imaging studies is accompanied by a corresponding increase in cost and exposure to radiation for both patients and healthcare professionals.

- From 1980 to 2006, the number of radiologic procedures performed in the United States showed a ten-fold increase while the annual per-capita effective dose from radiologic and nuclear medicine procedures increased by 600% (Mettler et al., 2009).
- From 1996 to 2010, the number of computerized tomographic (CT) examinations tripled, while the number of ultrasounds nearly doubled (Smith-Bindman et al., 2012).
- From 1996 to 2010, advanced diagnostic imaging (i.e., CT, magnetic resonance imaging [MRI], nuclear medicine, and ultrasound) accounted for approximately 35% of all imaging studies (Smith-Bindman et al., 2012).
- From 1980 to 2006, the proportion of radiation exposure that is attributable to medical sources increased from 17% to 53% (Mettler et al., 2009).
- In 2006, while CT scans only accounted for approximately 17% of all radiologic procedures performed in the United States, they accounted for over 65% of the total effective radiation dose from radiologic procedures (Mettler et al., 2009).
- In 2006, the estimated per-capita effective radiation dose for radiologic procedures in the United States was nearly 20% higher than the average for other well-developed countries (Mettler et al., 2009).

Diagnostic imaging was prioritized as a topic area for measure development due to a high level of utilization, rising costs, and the need for measures to help promote appropriate use of imaging and improve outcomes.

Opportunity for Improvement
From 1996 to 2005 the use of musculoskeletal MRIs increased by 353.5% among Medicare recipients, while the use of musculoskeletal CT scans increased by 326.5%. In comparison, the use of musculoskeletal x-rays only increased 19.1% (Parker et al., 2008). A recent study by George et al. (2014) found that approximately 28% of all knee MRIs are performed without recent prior radiographs.

Evidence for Additional Information Supporting Need for the Measure

American College of Radiology (ACR), American Medical Association-convened Physician Consortium for Performance ImprovementÂ® (PCPIÂ®), National Committee for Quality Assurance (NCQA). Diagnostic imaging performance measurement set. Reston (VA): American College of Radiology (ACR); 2015 Feb. 58 p. [89 references]

George E, Tsipas S, Wozniak G, Rubin DA, Seidenwurm DJ, Raghavan K, Golden W, Tallant C, Bhargavan-Chatfield M, Burleson J, Rybicki FJ. MRI of the knee and shoulder performed before radiography. J Am Coll Radiol. 2014 Nov;11(11):1053-8. PubMed

Mettler FA, Bhargavan M, Faulkner K, Gilley DB, Gray JE, Ibbott GS, Lipoti JA, Mahesh M, McCrohan JL, Stabin MG, Thomadsen BR, Yoshizumi TT. Radiologic and nuclear medicine studies in the United States and worldwide: frequency, radiation dose, and comparison with other radiation sources--1950-2007. Radiology. 2009 Nov;253(2):520-31. PubMed

Parker L, Nazarian LN, Carrino JA, Morrison WB, Grimaldi G, Frangos AJ, Levin DC, Rao VM. Musculoskeletal imaging: Medicare use, costs, and potential for cost substitution. J Am Coll Radiol. 2008 Mar;5(3):182-8. PubMed

Smith-Bindman R, Miglioretti DL, Johnson E, Lee C, Feigelson HS, Flynn M, Greenlee RT, Kruger RL, Hornbrook MC, Roblin D, Solberg LI, Vanneman N, Weinmann S, Williams AE. Use of diagnostic imaging studies and associated radiation exposure for patients enrolled in large

integrated health care systems, 1996-2010. JAMA. 2012 Jun 13;307(22):2400-9. PubMed

Extent of Measure Testing

Some of the measures in this set are being made available without any prior testing. The Physician Consortium for Performance Improvement (PCPI) recognizes the importance of testing all of its measures and encourages testing of the diagnostic imaging measurement set for feasibility and reliability by organizations or individuals positioned to do so. The *Measure Testing Protocol for PCPI Measures* was approved by the PCPI in 2010 and is available on the PCPI Web site (see Position Papers at www.physicianconsortium.org); interested parties are encouraged to review this document and to contact PCPI staff. The PCPI will welcome any opportunity to promote the initial testing of these measures and to ensure that any results available from testing are used to refine the measures before implementation.

Evidence for Extent of Measure Testing

American College of Radiology (ACR), American Medical Association-convened Physician Consortium for Performance ImprovementÂ® (PCPIÂ®), National Committee for Quality Assurance (NCQA). Diagnostic imaging performance measurement set. Reston (VA): American College of Radiology (ACR); 2015 Feb. 58 p. [89 references]

State of Use of the Measure

State of Use

Current routine use

Current Use

not defined yet

Application of the Measure in its Current Use

Measurement Setting

Ambulatory/Office-based Care

Ambulatory Procedure/Imaging Center

Hospital Inpatient

Hospital Outpatient

Long-term Care Facilities - Other

Skilled Nursing Facilities/Nursing Homes

Professionals Involved in Delivery of Health Services

not defined yet

Least Aggregated Level of Services Delivery Addressed

Single Health Care Delivery or Public Health Organizations

Statement of Acceptable Minimum Sample Size

Does not apply to this measure

Target Population Age

Age greater than or equal to 18 years

Target Population Gender

Either male or female

National Strategy for Quality Improvement in Health Care

National Quality Strategy Aim

Better Care

National Quality Strategy Priority

Making Care Safer
Making Quality Care More Affordable
Prevention and Treatment of Leading Causes of Mortality

Institute of Medicine (IOM) National Health Care Quality Report Categories

IOM Care Need

Getting Better

IOM Domain

Effectiveness

Efficiency

Safety

Data Collection for the Measure

Case Finding Period

Unspecified

Denominator Sampling Frame

Patients associated with provider

Denominator (Index) Event or Characteristic

Clinical Condition

Diagnostic Evaluation

Patient/Individual (Consumer) Characteristic

Denominator Time Window

not defined yet

Denominator Inclusions/Exclusions

Inclusions
All imaging studies for patients aged 18 years and older with knee pain who undergo knee magnetic resonance imaging (MRI) or magnetic resonance arthrography (MRA)

Exclusions
Unspecified

Exceptions
None

Exclusions/Exceptions

not defined yet

Numerator Inclusions/Exclusions

Inclusions
Imaging studies for patients known to have had knee radiographs performed within the preceding 3 months based on information from the radiology information system (RIS), patient-provided radiological history, or other health-care source

Note: Images and/or results of prior knee radiographs should be available to the radiologist at the time of the knee magnetic resonance imaging (MRI) or magnetic resonance arthrography (MRA). If the report, but not images, from prior radiographs are available, this should be noted in the final report.

Exclusions
Unspecified

Numerator Search Strategy

Fixed time period or point in time

Data Source

Electronic health/medical record

Imaging data

Paper medical record

Registry data

Type of Health State

Does not apply to this measure

Instruments Used and/or Associated with the Measure

Unspecified

Computation of the Measure

Measure Specifies Disaggregation

Does not apply to this measure

Scoring

Rate/Proportion

Interpretation of Score

Desired value is a higher score

Allowance for Patient or Population Factors

not defined yet

Standard of Comparison

not defined yet

Identifying Information

Original Title

Measure #8: appropriate use of imaging for knee pain.

Measure Collection Name

Diagnostic Imaging Performance Measurement Set

Submitter

American College of Radiology - Medical Specialty Society

Developer

American College of Radiology - Medical Specialty Society

National Committee for Quality Assurance - Health Care Accreditation Organization

Physician Consortium for Performance ImprovementÂ® - Clinical Specialty Collaboration

Funding Source(s)

Unspecified

Composition of the Group that Developed the Measure

Diagnostic Imaging Measure Development Work Group Members

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- Dorothy Bulas, MD (pediatric radiology)
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- Richard T. Griffey, MD, MPH (emergency medicine)
- Eric J. Hohenwalter, MD (vascular interventional radiology)
- Deborah Levine, MD, FACR (radiology/ultrasound)
- Mark Morasch, MD (vascular surgery)
- Paul Nagy, MD, PhD (radiology)
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- Hoang D. Nguyen (diagnostic radiology/payer representative)
- Charles J. Prestigiacomo, MD, FACS (neurosurgery)
- William G. Preston, MD, FAAN (neurology)
- Robert Pyatt, Jr., MD (diagnostic radiology)
- Robert Rosenberg, MD (diagnostic radiology)
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- B Winfred (B.W.) Ruffner, MD, FACP (medical oncology)
- Frank Rybicki, MD, PhD, FAHA (diagnostic radiology)
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- John Schneider, MD, PhD (internal medicine)
- Gary Schultz, DC, DACR (chiropractic)
- Paul R. Sierzenski, MD, RDMS (emergency medicine)
- Michael Wasylik, MD (orthopedic surgery)

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Financial Disclosures/Other Potential Conflicts of Interest

None of the members of the Diagnostic Imaging Work Group had any disqualifying material interest under the Physician Consortium for Performance Improvement (PCPI) Conflict of Interest Policy.

Adaptation

This measure was not adapted from another source.

Date of Most Current Version in NQMC

2015 Feb

Measure Maintenance

This measure is reviewed and updated every 3 years.

Date of Next Anticipated Revision

2018

Measure Status

This is the current release of the measure.

Measure Availability

Source available from the American College of Radiology (ACR) Web site .

For more information, contact ACR at 1891 Preston White Drive, Reston, VA 20191; Phone: 703-648-8900; E-mail: info@acr.org; Web site: www.acr.org .

NQMC Status

This NQMC summary was completed by ECRI Institute on October 13, 2015. The information was verified by the measure developer on November 19, 2015.

Copyright Statement

This NQMC summary is based on the original measure, which is subject to the measure developer's copyright restrictions.

Production

Source(s)

American College of Radiology (ACR), American Medical Association-convened Physician Consortium for Performance ImprovementÂ® (PCPIÂ®), National Committee for Quality Assurance (NCQA). Diagnostic imaging performance measurement set. Reston (VA): American

College of Radiology (ACR); 2015 Feb. 58 p. [89 references]

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